US 20090160816A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2009/0160816 A1

(43) Pub. Date: Jun. 25, 2009

WESTERMAN et al.

(54) **MULTI-TOUCH CONTACT MOTION EXTRACTION**

(76) Inventors: **Wayne WESTERMAN**, San Francisco, CA (US); **John G. Elias**, Townsend, DE (US)

Correspondence Address:
**APPLE C/O MORRISON AND FOERSTER ,LLP**
**LOS ANGELES**
**555 WEST FIFTH STREET SUITE 3500**
**LOS ANGELES, CA 90013-1024 (US)**

(21) Appl. No.: **12/342,027**

(22) Filed: **Dec. 22, 2008**

**Related U.S. Application Data**

(60) Continuation of application No. 11/559,822, filed on Nov. 14, 2006, which is a continuation of application No. 11/015,434, filed on Dec. 17, 2004, now Pat. No. 7,339,580, which is a continuation of application No. 09/919,266, filed on Jul. 31, 2001, now Pat. No. 6,888,536, which is a division of application No. 09/236,513, filed on Jan. 25, 1999, now Pat. No. 6,323,846.

(60) Provisional application No. 60/072,509, filed on Jan. 26, 1998.

**Publication Classification**

(51) **Int. Cl.**
*G06F 3/041* (2006.01)

(52) **U.S. Cl.** ..... **345/173**

(57) **ABSTRACT**

Apparatus and methods are disclosed for simultaneously tracking multiple finger and palm contacts as hands approach, touch, and slide across a proximity-sensing, multi-touch surface. Identification and classification of intuitive hand configurations and motions enables unprecedented integration of typing, resting, pointing, scrolling, 3D manipulation, and handwriting into a versatile, ergonomic computer input device.